REMARKS/ARGUMENTS

Claims 1-6, 10-19, 41-46, and 48-59 are presently pending in the application. New claims 54-59 have been added to the application.

During a telephonic interview between the undersigned attorney and the Examiner on January 14, 2004, the various rejections of the claims were discussed with respect to the present invention and the cited prior art references. The benefits and advantages of the present invention were also discussed and compared with the teachings of the prior art references. It was pointed out to the Examiner that one of the advantages of the present invention is the ability to enable a network device to dynamically adapt to changing network conditions, for example, by automatically reconfiguring at least one of its operating parameters in order to more suitably handle changed conditions in the network.

For example, page 10, lines 1-21 of the present application illustrate by way of example several limitations of conventional data networks which may occur when insufficient bandwidth has been allocated or provisioned on a virtual circuit to support, for example, high-quality video/voice conferencing applications. In this example it is assumed that the current CIR and EIR bandwidth values for virtual circuit 150 (FIGURE 1) are insufficient for supporting high quality video/voice applications, resulting in the client 102 receiving poor quality video images and voice information from server 114. In order to provide high-quality video/voice conferencing, one desirable solution would be to adjusted the current CIR and EIR bandwidth values to accommodate higher bandwidth usage on virtual circuit 150. However, according to conventional techniques, in order to increase the CIR and/or EIR values on the virtual circuit 150, a plurality of network elements within the WAN which form the communication path between client machine 102 and server 114 must be statically reconfigured by a human operator to support the new CIR and EIR values. There is no teaching or suggestion in the cited prior references which provides the capability for one or more network elements to dynamically reconfigure themselves to adjust their corresponding CIR and EIR values in order to provide for increased bandwidth sufficient to accommodate the high-quality video/voice conferencing application.

During the telephonic interview, the Examiner asserted that Figure 21 and Column 6, lines 5-18 of Abe et al. (US 6,108,304) teache the feature of enabling dynamic adjustment of

available bandwidth in a network element. Moreover, the Examiner asserted that such teachings in Abe could inherently be used to overcome the above-described problems presented in the example of page 10 of the application. Applicants respectfully disagree.

In general, the primary reference Abe discloses a system having a network management equipment (200 of Fig. 1) which receives bandwidth values for routes connected to other network elements EA~ED (Fig. 1). The received bandwidth information is then used to calculate an available bandwidth for such routes, and this calculated available bandwidth information is sent to the network elements EA~ED so they can determine themselves which routes to use based on the provided available bandwidths for such routes. See Column 7, lines 32-60 and Column 9, lines 1-12.

For further clarification, Column 5, line 59 through Column 6, line 18 of Abe states:

> FIG. 21 shows a procedure for storing bandwidth information in each node. This procedure is divided into the following steps: Each edge node or relay node measures a dynamically changing bandwidth (step 2101), the edge node or the relay node reports the measured bandwidth to the network management equipment (step 2102), the network management equipment sets up an available bandwidth for each route based on the received bandwidth information (step 2103), the network management equipment manages the assigned bandwidth for each route-between-route (step 2104), the network management equipment distributes bandwidth information to each node (step 2105), and each node stores the bandwidth information (step 2106).
>
> The dynamically changing bandwidth refers to a bandwidth currently used by each node for data transfer. This bandwidth is measured at each node (edge node and relay node), for example, for each connection. An available bandwidth for each route refers to a bandwidth available for each transfer route for additional use. The network management equipment 200 calculates this available bandwidth for each node based on the dynamically changing bandwidth that was measured. An assigned bandwidth for each

route-between-route is a bandwidth assigned to each route-between-route between access networks (that is, between edge nodes). The network management equipment determines this assigned bandwidth so that it does not exceed the available bandwidth for each route.

It is clear from this teaching that the updated bandwidth information provided by the network management equipment to each of the network nodes enables the network nodes to perform routing decisions based upon available bandwidth conditions in the network. However, such routing decisions may be implemented at the network node of Abe without any change and/or adjustment to any of the control parameters which govern its operating parameters. Thus, for example, in the video conferencing example described above, a network element in the system of Abe may use the updated bandwidth information provided by the network management equipment to attempt to route traffic between client machine 102 and server 114 in a manner which utilizes the highest amount of available bandwidth on links within the virtual circuit 150. However, if the maximum allowable bandwidth on virtual circuit 150 (as defined, for example, by the CIR and EIR values associated with that circuit) is insufficient to support the high-quality video conferencing application, the network node of Abe will be unable to resolve the problem since it is not provided with the capability of dynamically adjusting its control parameters (e.g., its CIR and/or EIR values) to provide for an increased amount of maximum allowable bandwidth on the virtual circuit 150.

In contrast, as shown in figure 12, and as described, for example, and pages 25-28 of the application, if it is detected that there is insufficient bandwidth on virtual circuit 150 to support a high-quality video conferencing application between client machine 102 and server 114, updated control information may be provided to one or more network elements for causing an adjustment amount to each of the network elements' CIR value in order to increase the maximum allowable bandwidth of desired links within the virtual circuit 150. Thus, it will be appreciated that the teachings of the prior art references to not provide the same advantages and features as those provided by the claimed present invention, nor are the teachings of the prior references able to solve the same problems and issues which are solved using the technique of the present invention.

Claim 1 of the present application is directed towards a method "for providing dynamic feedback control of network elements in a data network, the data network including a plurality of network elements, each of said network elements having a plurality operating parameters associated therewith, said operating parameters being related to at least one control parameter of said element." Claim 1 also defines the limitations of "receiving information relating to an operation of a first subset of the plurality of network elements" and "providing at least a portion of said received information to at least one analysis entity for analyzing said portion of received data and calculating updated control information based on such analysis, wherein the updated control information specifies an adjustment amount to a control parameter of the at least one network element." Claim 1 also defines "receiving the updated control information calculated by the analysis entity" and "providing the updated control information to at least one of the network elements."

On page 4 of the office action, the Examiner states that Abe teaches calculating updated control information (available bandwidth) and providing it to the network elements (Column 7, lines 51-60). The Examiner further states that this control information inherently includes the bandwidth adjustment amount to change the network elements bandwidth to the desired value. Applicant respectfully disagrees.

Column 7, lines 51-60 states:

> [The] bandwidth information is distributed from the network management equipment 200 to each edge node. More specifically, the information is distributed to the routing table 1302 via the network management data storage device 401, data writing module 404, and transmit and receive module 408 shown in FIG. 4, the node controller 40 shown in FIG. 12, and the line controller shown in FIG. 13 (step 2105). The bandwidth information is then stored in the routing table 1302 of each edge node.

From this teaching, it would be clear to one having ordinary skill in the art that the updated bandwidth information provided by the network management equipment to each of the network nodes in Abe is stored into the routing tables of each node, and is used by the network nodes to perform routing decisions based upon current traffic (e.g., available bandwidth) conditions in the network. Such updated bandwidth information relates merely to the available

bandwidth information stored within the routing table of a particular network element in Abe. Such updated bandwidth information does not include an adjustment amount for adjusting a control parameter of the network element. It is submitted that one having ordinary skill in the art would not interpret the updating of available bandwidth information in the routing table of a network element to fall within the meaning of specifying an adjustment amount of a control parameter of a network element to thereby provide dynamic feedback control of network elements in a data network.

Moreover, Applicants respectfully traverse the Examiner's assertion that the updated bandwidth information provided to the network elements (in Abe) inherently includes a bandwidth adjustment amount to change the network element's bandwidth to the desired value. As stated in Column 7, lines 51-60 of Abe, the only information which is provided from the network management equipment 200 to each edge node is the available bandwidth information which is to be stored in the routing table of the network node. Such information does not include an adjustment amount to any control parameter of the network element. The available bandwidth information provided by the network management equipment 200 merely provides the network element with information relating to available bandwidth on particular links. Additionally, there is no teaching or suggestion in Abe that the bandwidth information includes an adjustment amount to cause the network element's bandwidth to change to a desired value (as suggested by the Examiner). It is submitted that such an interpretation would be contrary to the teachings of Abe since Abe clearly teaches that the network element does not use the available bandwidth information to change its internal configuration or control parameters, but rather uses the available bandwidth information to select, for traffic routing purposes, a permanent virtual route (PVR) in the network which currently has the largest available bandwidth value. (Column 8, through Column 9, line 19) Moreover, the selection of the PVR as performed by the network element is not dictated by any control parameter adjustment information which is provided by the network management equipment 200. More specifically, the updated bandwidth information which is provided to the network element of Abe merely provides an indication as to what resources are currently available to the network element, and does not specify an adjustment amount to a NEs control parameter, in the manner claimed. For at least theses reasons, it is respectfully submitted that there is no express nor inherent teaching in Column 7, lines 51-60 of Abe which suggests that the updated bandwidth information provided from the network management equipment 200 to the network element includes an adjustment amount of a control parameter to cause the network element's bandwidth to change to a desired value. Should the

Examiner continue to reject claims of this application based upon this assertion, the Examiner is respectfully requested to provide citations to other specific text in Abe which support such an assertion.

In contrast to the teachings of the cited prior art references, the technique of the present invention provides for the calculation of updated control information which specifies an adjustment amount to a control parameter of a network element (NE) based on analysis of information that relates to the operation of a subset of network elements. This updated control information which specifies an adjustment amount to a control parameter of a NE is then provided to such NE. The present invention advantageously provides dynamic feedback for controlling and specifying an adjustment amount to a control parameter of a NE based on analysis of network operation. In other words, a feedback loop is provided for specifying an adjustment amount to a control parameter of the operation of each NE on the fly, as opposed to performing a pre-configuring operation in a single event without subsequent adjustment, *e.g.,* as part of a service subscription package.

The cited references Abe and Hansen both fail to disclose and suggest dynamically providing updated control information to a network element, where the updated control information specifies an adjustment amount to a control parameter of the at least NE and such updated control information is calculated based on the operation of a subset of NEs. In sum, both references fail to specify an adjustment amount to a control parameter of a NE, in the manner claimed. In contrast to specifying an adjustment amount to an NE, both references teach merely providing information on the bandwidth which is available in a subnetwork. Presumptively, even if the NE could determine its own adjustment amount based on the updated bandwidth information, such adjustment amount is in no way provided to the network element by the network management equipment 200.

Additionally, the reference Abe and the reference Hansen have similar goals of providing mere measurement information such as available bandwidth (Abe) or resource utilization (Hansen) to a node so that the node can perform it's own routing selection. Each reference teaches that a node determines on its own how to perform it's routing decisions and/or resource allocation, based on the available bandwidth or resource information. This information which is provided to the node merely provides an indication as to what resources are currently available to the node, and does not specify an adjustment amount to a NEs control parameter, in the manner

claimed. In sum, both references teach away from providing dynamic feedback of control information which specifies an adjustment amount to a control parameter of a NE, in the manner claimed.

Since both Abe and Hanson fail to teach or suggest providing to a network element updated control information which specifies an adjustment amount to a control parameter of a NE that was calculated based on network operation in the manner claimed, it is respectfully submitted that claims 1, 40, 47, and 53 are patentable over Abe and Hanson. Additionally, the Examiner's rejections of the dependent claims are also respectfully traversed. However, to expedite prosecution, all of these claims will not be argued separately. Claims 2-6, 10-19, 41-46, and 48-52 each depend directly from independent claims 1, 40, or 47 and, therefore, are respectfully submitted to be patentable over cited art for at least the reasons set forth above with respect to claims 1, 40, and 47.

Newly added dependent claims 54-59 are also believed to be allowable for at least the reasons set forth above with respect to claims 1, 40, and 47.

Claims 1-6, 10-19, 41-46, and 48-59 are presently pending application. Reconsideration of the rejected claims as well as an early indication of all of the presently pending claims is earnestly solicited. The Examiner is invited to telephone the undersigned attorney in any matters remain which could benefit from such a conversation.

Respectfully submitted,
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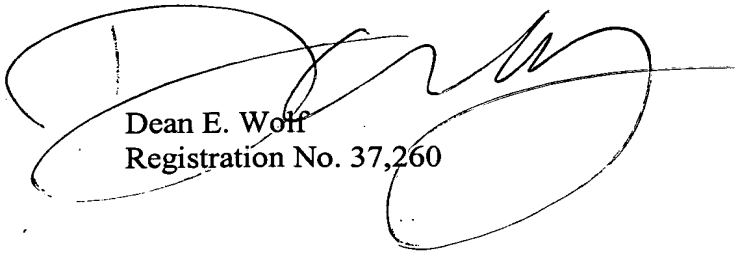

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